

37419
S/188/62/000/002/005/013
B125/B102

3.5000

3.5110

AUTHORS:

Dyubyuk, A. F., Berezin, V. M.

TITLE:

A problem of forecasting the atmospheric pressure field

PERIODICAL:

Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 2, 1962, 36-40

TEXT: The atmospheric pressure field is forecast by solving (in geostrophic approximation) the complete system of hydrodynamic equations in a volume bounded by the coordinate planes. The problem is infinite as regards the vertical coordinate. In the atmosphere regarded as an ideal fluid, where $1/c^2 \approx 0$ (c = sonic velocity), the air masses are mainly transferred (as an adiabatic process) at geostrophic velocity with the components U and V . After a passage to the coordinate system of the main current, the linearized, initial system of hydrodynamic equations in the earth-bound coordinate system furnishes a partial differential equation of the Sobolev type from which, by a Laplace-Carson transformation, one obtains

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S/188/62/000/002/005/013
B125/B102

A problem of forecasting the ...

$$\frac{\partial^2 \bar{Q}}{\partial z^2} + \frac{p^2}{p^2 + l^2} \Delta' \bar{Q} = \frac{1}{p^2 + l^2} \left(p^2 \Delta' \bar{Q} + p \Delta' \bar{Q}_t + g l^2 \frac{\partial \bar{Q}}{\partial z} \right) = \bar{F}, \quad (6).$$

\bar{Q} , $\Delta' \bar{Q}$, and \bar{F} are mappings of functions. Moreover, $\vartheta = \vartheta_1$, $Q = \bar{Q} + Q_1$; $Q = RT_0 \ln(P/P_0) + gz$; g denotes gravitational acceleration, and l is the Coriolis parameter. The quantities with superscript zero denote their values at $t = 0$. By formulating the solution as

$$\bar{Q} = \sum_{m=1}^{\infty} \sum_{n=1}^{\infty} A_m(\xi) B_n(\eta) D_{mn}(z),$$

(7)

$$A_m(\xi) = \sin \frac{m\pi\xi}{L_1}; \quad B_n(\eta) = \sin \frac{n\pi\eta}{L_2}.$$

one obtains

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A problem of forecasting the ...

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$$\bar{Q}' = \sum_{m=1}^{\infty} \sum_{n=1}^{\infty} \left[-\frac{g}{x_{mn}} e^{-x_{mn} z} \delta_{mn}^z - \int_0^{\infty} \bar{f}_{mn} \frac{1}{2x_{mn}} \left(e^{-x_{mn}|z-z'|} + e^{x_{mn}|z+z'|} \right) dz' \right] \times \\ \times \sin \frac{m\pi\xi}{L_1} \sin \frac{n\pi\eta}{L_2}, \quad (12) \text{ with}$$

$$\bar{f}_{mn} = \frac{4}{L_1 L_2} \int_0^{L_1} \int_0^{L_2} \left(\frac{\rho^2 \Delta \bar{Q}'}{\rho^2 + l^2} + \frac{\rho \Delta \bar{Q}'}{\rho^2 + l^2} + \frac{g l^2}{\rho^2 + l^2} \cdot \frac{\partial \bar{Q}'}{\partial z} \right) \frac{1}{2x_{mn}} \times \\ \times \sin \frac{m\pi\xi}{L_1} \sin \frac{n\pi\eta}{L_2} d\xi d\eta. \quad (11),$$

where $x^2 = p^2 d_{mn}^2 / (p^2 + l^2)$ with $d_{mn}^2 = \pi^2 \left[(m^2 / L_1^2) + (n^2 / L_2^2) \right]$. The extensive solution Q , obtained by inverse Laplace transformation, contains improper integrals of Bessel functions with respect to z , and of trigonometric and Bessel functions with respect to time. For a given time interval

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A problem of forecasting the ...

S/188/62/000/002/005/013
B125/B102

$\Delta t = t - t_0$, this solution can be obtained with a wide step and electronic computers.

ASSOCIATION: Kafedra fiziki atmosfery (Department of Physics of the Atmosphere)

SUBMITTED: May 22, 1961

Card 4/4

BEREZIN, V.M.

Numerical calculation of the atmospheric pressure field using the complete system of hydrodynamic equations. Vest.Mosk.un. ser.3: Fiz.,astron. 17 no.6:82-83 N-D '62. (MIRA 15:12)

1. Kafedra fiziki atmosfery Moskovskogo universiteta.
(Atmospheric pressure) (Hydrodynamics)

ACCESSION NR: AP4013147

S/0203/64/004/001/0131/0136

AUTHORS: Berezin, V. M.; Shafrin, Yu. A.

TITLE: Computing the vertical distribution of atmospheric ozone

SOURCE: Geomagnetizm i aeronomiya, v. 4, no. 1, 1964, 131-136

TOPIC TAGS: ozone, atmospheric ozone, vertical distribution, troposphere, stratosphere, turbulence coefficient, anticyclone, cyclone, horizontal ozone gradient

ABSTRACT: The authors have based their work on average vertical ozone distribution above Arosa. The difference scheme

$$\frac{p_{i,j+1} - p_{i,j}}{\Delta t} - \frac{D_i(p_{i+1,j} - 2p_{i,j} + p_{i-1,j}))}{h^2} - (\bar{D}_i - w) \frac{p_{i+1,j} - p_{i-1,j}}{2h} + (\alpha + c) p_{i,j} = \alpha p_{i,j}$$

(where Δt and h represent steps of time and the coordinate, i and j the coordinate and time number of the step, p the ozone density, D the coefficient of turbulent diffusion, w the vertical velocity of the air, and $\alpha = 1/\tau$ is a coefficient equal

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ACCESSION NR: AP4013147

to the reciprocal value of time for half restoration of photochemical equilibrium) satisfactorily describes possible changes in vertical ozone distribution. This is confirmed particularly by sample computation of ozone distribution with zero initial distribution. The coefficient of turbulent diffusion in combination with vertical velocity has a fundamental effect on diminution of total ozone content during ascending currents and on increase during descending currents. Computations have shown that, when there is no vertical velocity, diffusion has no noticeable effect on the distribution of ozone. When turbulence is insignificant in the troposphere and lower stratosphere during ascending movements, two secondary maximums of concentration appear at low altitudes. These maximums fuse into one, weakly defined, when turbulence increases. Descending movements, especially during increased turbulence, do not favor development of secondary maximums. The presence of ascending and descending currents in cyclones and anticyclones leads to accumulation of ozone upward and decrease in ozone downward in the cyclone. The reverse is true in the anticyclone. This may give rise to a horizontal ozone gradient over extensive regions and also to a horizontal gradient within individual layers. Orig. art. has: 2 figures, 2 tables, and 7 formulas.

Card 2/3

ACCESSION: AP4013147

ASSOCIATION: Moskovskiy gosudarstvennyy universitet, Fizicheskiy fakul'tet
(Moscow State University, Physics Department)

SUBMITTED: 04Jul63

DATE ACQ: 02Mar64

ENCL: 00

SUB CODE: AS• PH

NO REF SOV: 006

OTHER: 003

Card

3/3

ANTONOV, D.A.; BEREZIN, V.M.

New method for determining residual water content in rock
samples. Trudy UFNII no.2:128-131 '57. (MIRA 12:1)
(Rocks--Analysis)

BEREZIN, V.M.

New methods for determining oil content in rock samples. Trudy
UFNII no.2:132-139 '57. (MIRA 12:1)
(Rocks--Analysis)

SOV/124-58-10-11337

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 10, p 92 (USSR)

AUTHOR: ~~Berezin, V.M.~~

TITLE: Determination of the Amount of Oil Displaced by Water From
Cemented Rock Specimens (Opredeleniye nefteotdachi obraztsov
stsementirovannykh gornyykh porod pri vytesnenii nefi vodoy)

PERIODICAL: Tr. Ufimsk. nef. n.-i. in-t, 1957, Nr 2, pp 140-154

ABSTRACT: An account of methods and results of laboratory experiments on the determination of the amount of oil displaced by water under pressure. A great deal of attention is devoted to the preparation and mounting of specimens in various types of core-holders, as well as to preparation of a special simulated petroleum. The amount of displaced oil was determined by the volumetric method or by the method of drying followed by a calorimetric analysis. The experimental results are arranged in form of tables and graphs representing the oil yield as a function of the water/oil factor. Bibliography: 5 references.
M.V. Filinov

Card 1/1

BEREZIN, V. M., Candidate Geolog-Mineralog Sci (diss) -- "Methods of determination and the characteristics of the initial oil-and-water saturation and oil yield of productive rock of the Devonian and Carboniferous deposits of Bashkiria". Ufa, 1959. 12 pp (Min Higher Educ USSR, Kuybyshev Industrial Inst im V. V. Kuybyshev, Ufa Petroleum Sci Res Inst UFNII), 120 copies (KL, No 25, 1959, 129)

BEREZIN, V.M.

Oil recovery from samples of Devonian sandstones and the lower Carboniferous coal-bearing series of Bashkiria in water flood operations. Trudy VNII no.24:79-102 '59.

(MIRA 13:5)

(Bashkiria--Sandstone--Permeability)

ACCESSION NR: AP3009487

8/0188/63/000/005/0028/0033

AUTHOR: Berezin, V. M.

TITLE: One boundary problem in atmospheric pressure forecasting according to a complete system of hydrodynamic equations

SOURCE: Moscow. Universitet. Vestnik. Seriya 3. Fizika, astronomiya, no.5, 1963, 28-33

TOPIC TAGS: pressure, atmospheric pressure, weather forecasting, hydrodynamics, hydrodynamic equation, atmospheric dynamics, wind, geostrophic wind, acoustic vibration, atmospheric current, air current, meteorology

ABSTRACT: The development of new methods of weather forecasting based on solution of the system of initial equations of atmospheric dynamics rather than the integration of equations of geostrophic wind is assuming great importance. The general approach to the solution is a direct continuation and development of the numerical method of forecasting as proposed by L. Richardson. A system of hydrodynamic equations is used, and this includes acoustic vibrations, the vertical component of wind velocity. Thus, the solution of the problem should be applicable to fore-

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ACCESSION NR: AP3009487

casts of meteoric fields based on equations of the mechanics of a compressible liquid. It also takes into account the west-east transfer and fringe and initial conditions. It uses the system of initial equations as proposed by A. F. Dyubyuk:

$$\begin{aligned} u_t - (v + Q_x) &= -(\partial Q_x + uu_x + uv_y + uw_z) = F_1, \\ v_t + (u + Q_y) &= -(\partial Q_y + uv_x + vv_y + vw_z) = F_2, \\ w_t + Q_z &= -[\partial(Q_z - g) + uw_x + vw_y + ww_z] = F_3, \\ \frac{1}{c_s} Q_t + u_x + v_y + w_z &= -\frac{1}{c_s} [uQ_x + vQ_y + w(Q_z - g)] = F_4, \\ \partial_t + \frac{AR}{c_v} (u_x + v_y + w_z) &= \frac{AR}{c_v} \partial (u_x + v_y + w_z) - (u\partial_x + v\partial_y + w\partial_z) = F_5, \end{aligned} \quad (1)$$

$$(2)$$

where u, v, w are components of wind velocity along axes x, y, z ; $l=2\omega\sin\varphi$ Coriolis' parameter, g acceleration due to gravity, ω angular velocity of the earth's rotation, φ latitude. In previous papers by Dyubyuk and Beresin, the solution of these equations for unlimited half space was found in the form of

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ACCESSION NR: AP3009487

triple integrals. The procedure for solution on an electronic computer proved to be rather complex. In this article the solution is sought in general form for marginal problems. The problem is solved for deviations of unknown functions from their values definable by the general west-east transfer. The existence of a west-east transfer in the middle latitudes and superposition of the movement on some "basic current" are assumed. The solution is for a closed limited volume. The field is calculated on an electronic computer with a large memory by the use of the following formula:

$$Q' = \sin(\sigma_{max} \tau) \left\{ \frac{16\mu_1}{i\pi^2} \left[\frac{1}{9} \cos \frac{\pi\xi}{L_1} \cos \frac{\pi\eta}{L_2} \cos \frac{\pi z}{2H} \right] + \right. \\ \left. + \frac{4}{i} \mu_1 \cos \frac{2\pi\xi}{L_1} \cos \frac{2\pi\eta}{L_2} \cos \frac{\pi z}{H} + \frac{16}{i\pi^2} \mu_1 \left[\cos \frac{2\pi\xi}{L_1} \sum_{K=1}^{\infty} \frac{\cos \frac{K\pi\xi}{L_1}}{K} - \right. \right. \\ \left. \left. - \frac{2}{3} \cos \frac{\pi\xi}{L_1} - \frac{1}{4} - \frac{1}{8} \cos \frac{2\pi\xi}{L_1} \right] \left[\cos \frac{2\pi\eta}{L_2} \sum_{K=1}^{\infty} \frac{1}{K} \cos \frac{K\pi\eta}{L_2} - \frac{2}{3} \cos \frac{\pi\eta}{L_2} - \right. \right. \\ \left. \left. - \frac{1}{4} - \frac{1}{8} \cos \frac{2\pi\eta}{L_2} \right] \cos \frac{\pi z}{2H} \right\}. \quad (10) \quad (3)$$

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ACCESSION NR: AP3009487

"In conclusion, the author expresses deep thanks to Professor A. F. Dyubyuk for his attention to the work and his valuable advice." Orig. art. has: 11 formulas and 2 figures.

ASSOCIATION: Kafedra fiziki atmosfery*, Moskovskiy universitet (Department of Atmospheric Physics, Moscow University)

SUBMITTED: 00

DATE ACQ: 08Nov63.

ENCL: 00

SUB CODE: ES

NR-REF SOV: 00

OTHER: 000

Card 4/4

BEREZIN, V.M.; SHAFRIN, Yu.A.

Calculation of the vertical distribution of atmospheric ozone.
Geomag. i aer. 4 no.1:131-136 Ja-F'64. (MIRA 17:2)

1. Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta.

KOVALENKO, K.I. MARKHASIN, I.L.; BEREZIN, V.M.; PANTELEYEV, V.G.

Increasing the oil yield of beds by injecting carbonated water.
Neft. khoz. 42 no.11:6-9 N '64 (MIRA 18:2)

ACCESSION NR: AP4033638

S/0188/64/000/002/0079/0081

AUTHOR: Berezin, V. M.

TITLE: Nonlinear boundary problem of forecasting the field of atmospheric pressure for a limited space

SOURCE: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 2, 1964, 79-81

TOPIC TAGS: meteorology, weather forecasting, atmospheric pressure

ABSTRACT: In weather forecasting the central problem usually is precomputation of the field of atmospheric pressure. Two approaches usually are used for this purpose: the Cauchy problem is solved for an unbounded space or a boundary problem is solved. In this article the boundary problem is solved for forecasting the field of atmospheric pressure, using the full system of equations in hydrodynamics proposed by A. F. Dyubyuk (DAN SSSR,

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ACCESSION NR: AP4033638

123, No. 2, 1958).

$$\begin{aligned} u_t - (v + Q_x) &= -(\partial Q_x + uu_x + vv_y + ww_z) \equiv F_1, \\ v_t + (u + Q_y) &= -(\partial Q_y + uv_x + vv_y + ww_z) \equiv F_2, \\ w_t + Q_z &= -[\partial(Q_z - g) - uw_x + vw_y + ww_z] \equiv F_3, \\ \frac{1}{c^2} Q_t + u_x + v_y + w_z &= -\frac{1}{c^2} [uQ_x + vQ_y + w(Q_z - g)] \equiv F_4. \end{aligned} \quad (1)$$

$$\phi_t + \frac{AR}{c_p} (u_x + v_y + w_z) = \frac{AR}{c_p} \phi (u_x + v_y + w_z) - (u\phi_x + v\phi_y + w\phi_z) \equiv F_5,$$

where u, v, w are the wind velocity components, g is acceleration of gravity, $\mathcal{L} = 2\omega \sin \varphi$ is the Coriolis force, ω is the angular velocity of the earth's rotation, φ is latitude. In the local problem it is assumed that $\mathcal{L} = \text{const}$. It also is assumed that $T = T' + T_0$, where T_0 is a constant value (such as 273°), $\int \frac{T'}{T_0}$, $Q = RT_0 \ln \frac{p}{p_0} + gz$, where p is pressure, $p_0 = 1000$ mb, R is the gas constant, A is the thermal equivalent of work, $c^2 = \frac{c_p}{c_v}$. When $t = 0$ the initial conditions are denoted:

$$u = u_0, v = v_0, w = w_0, Q = Q_0, \phi = \phi_0. \quad (2)$$

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ACCESSION NR: AP4033638

System (1) can be reduced to an integro-differential system by its solution relative to u , v , w , Q , expressing them through F_1 . It is easy to show that system (1) can be reduced to the equation

$$\left[\frac{\partial^2}{\partial t^2} \left(\frac{1}{c^2} \frac{\partial^2}{\partial t^2} - \Delta \right) + \epsilon \left(\frac{1}{c^2} \frac{\partial^2}{\partial t^2} - \frac{\partial}{\partial t^3} \right) \right] Q = \Phi, \quad (3)$$

where Φ are nonlinear terms. If it is assumed that $\frac{1}{c^2} \approx 0$, equation (3) can be written

$$\frac{\partial^2}{\partial t^2} \Delta Q + \epsilon \frac{\partial^2 Q}{\partial t^3} = \Phi, \quad (4)$$

and this equation will be used for prognostic purposes. The problem of predicting the field Q using equation (4) for an unbounded space already has been solved. However, computations have shown that use of an unbounded region for forecasting leads to considerable complexities when obtaining a solution on electronic computers. Equation (4) therefore will be used for forecasting the field Q with boundary conditions. Due to the nonlinearity of the right-hand side of equation (4) the problem will be solved numerically in time steps using initial data for the field Q for two times of observation. It is assumed that the solution obtained analytically will be correct for each time step. The solution for each step is found by solution

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ACCESSION NR: AP4033638

of the linearized problem, using the method of separation of variables. The solution is obtained in a spectrum of harmonics; as a result of the nonlinear terms the problem must be solved numerically with time steps as indicated. "The author thanks Professor A. F. Dyubyuk for valuable advice and attention to the work." Orig. art. has: 17 formulas.

ASSOCIATION: Kafedra fiziki i atmosfery*, Moskovskiy universitet (Department of Physics and the Atmosphere, Moscow University)

SUBMITTED: 22Jan63

DATE ACQ: 30 Apr64

ENCL: 00

SUB CODE: ES

NO REF SOV: 005

OTHER: 000

Card 4/4

BEREZIN, V.M., kand. fiz.-matem. nauk; SHAFRIN, Yu.A.

Some results of numerical analysis of the vertical distribution of
ozone. Meteor. i gidrol. no.6:23-29 Je '65. (MIRA 18:5)

1. Moskovskiy gosudarstvennyy universitet.

BEREZIN, V.M.

Prof. A.F. Diubiuk. 1895- ; on his 70th birthday. Izv. AN SSSR
Fiz. atm. i okean. 1 no.7:771-772 J1 '65. (MIRA 18:8)

BEREZIN, V.M., kand. fis.-matem. nauk

Anatolii Fedorovich Diubink, 1895; on his 70th birthday. Meteor. i
gidrol. no.8:63 Ag '65. (MIRA 18:7)

L 3675-66 EWT(1)/FCC GW

ACCESSION NR: AP502186A

UR/0362/65/001/008/0781/0787
551.511

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AUTHOR: Berezin, V. M.

4455
TITLE: A short range forecast of the barometric and velocity fields of the atmosphere, based on a complete system of hydrodynamic equations

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 1, no. 8, 1965, 781-787

TOPIC TAGS: weather forecasting, velocity profile, pressure field, barometric pressure, atmospheric pressure, hydrodynamic equation, Laplace transformation, Green function

ABSTRACT: A method for solving a complete system of thermohydrodynamic equations of an ideal incompressible fluid in an adiabatic process is proposed in order to give a more complete evaluation of the pressure and velocity fields of the atmosphere for short range weather forecasting. The method is based on calculating (in the left-hand member of the third equation of motion) the vertical acceleration and the product of the acceleration of gravity multiplied by the divergence of the temperature from the average value. Linear terms are introduced into all the left-hand members of the equations. Both the uniform and nonuniform systems

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L 3675-66

ACCESSION NR: AP5021864

are solved by Laplace-Carson transformations. The solutions turn out to be various combinations of influence (Green) functions which can be expressed in terms of zero order Bessel functions and Struve functions. The behavior of the Green functions is investigated by the numerical "step" method for times up to 12 hours and for $0 \leq r/R \leq 1$ (r is the distance from the observation point, R is the gas constant). To solve for the pressure fields, it is necessary to know either the components of the initial wind velocity and the temperature field, or the initial pressure function and its time derivative. The equilibrium of the pressure field involves an integral-differential equation and is solved by "time steps" in a method similar to that used by I. A. Kibel' and A. F. Dyubyuk. The technique is applicable to mountainous regions where there are large vertical winds, which play a substantial role in determining orographic cyclogenesis. The author thanks A. M. Obukhov and A. F. Dyubyuk for their assistance. Orig. art. has: 2 figures and 12 formulas. 44, 55

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: 20Jan65

ENCL: 00

SUB CODE: ES, MA

NO REF SOV: 007

OTHER: 000

Card 2/2

L 1962-66 EWT(m)/T/EWA(m)-2

UR/3138/65/000/348/0001/0015

ACCESSION NR: AT5024122

AUTHOR: Vishnevskiy, M. Ye.; Galanina, N. D.; Semenov, Yu. A.; Krupchitskiy, P. A.;
Berezin, V. M.; Murysov, V. A.

TITLE: Measurement of the difference in the masses of K_2^0 - and K_1^0 - mesons

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Institut teoreticheskoy i eksperimental'noy fiziki. Doklady, no. 348, 1965. Izmereniye velichiny raznosti mass K_2^0 - and K_1^0 , 1-15

TOPIC TAGS: meson beam, K meson, pi meson

ABSTRACT: The value of the difference in the masses of K_2^0 - and K_1^0 -mesons was obtained by measuring the dependence of the intensity of coherent regeneration of K_1^0 -mesons in a beam of K_2^0 -mesons on the thickness of the regenerator (copper and aluminum). K_1^0 -mesons were recorded on the basis of the decay $K_1^0 \rightarrow \pi^+ + \pi^-$ with the aid of a magnetic spectrometer with scintillation counters and spark chambers. The distributions of the events over the mass of the decaying particle and angle between its momentum and the direction of the primary beam are given. In all, 196 events of coherently regenerated K_1^0 mesons were recorded. The value $\Delta m = (0.82 \pm 0.14) \hbar/\tau_1 c^2$ was obtained. "The authors thank Academician A. I. Alikhanov and

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L 1962-66
ACCESSION NR: AT5024122

10
S. Ya. Nikitin for their interest in the work, L. B. Okun' and I. Yu. Kobzarev for their discussion, L. L. Gol'din and members of the technical staff for supervising the operation of the accelerator, and A. K. Dubasov, V. N. Markizov, N. P. Naumov, V. N. Kuz'menkov, and Yu. S. Oreshnikov for assistance in setting up the apparatus and for carrying out the measurements." Orig. art. has: 4 figures, 1 formula.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki, Gosudarstvennyy komitet po izpolzovaniyu atomnoy energii (Institute of Theoretical and Experimental Physics, State Committee for Application of Atomic Energy)

SUBMITTED: 16Apr65

ENCL: 00

SUB CODE: NP

NO REF SOV: 005

OTHER: 005

RC
Card 2/2

BEREZIN, V.M.

Short-range forecasting of the baric and kinematic fields of the atmosphere by the complete system of equations of hydrodynamics. Izv. AN SSSR, Fiz. atm. i okeana 1 no.8:781-787 Ag '65.

(MIRA 18:9)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.

ACC NR: AF6017591

SOURCE CODE: UR/0367/66/003/002/0321/0326

AUTHOR: Vishnevskiy, M. Ye.; Galanina, N. D.; Semenov, Yu. A.; Kruptchitskiy, P. A.;
Berezin, V. M.; Murysov, V. A.

ORG: none

TITLE: Measurement of the mass difference of K_S^0 and K_L^0 mesons

SOURCE: Yadernaya fizika, v. 3, no. 2, 1966, 321-326

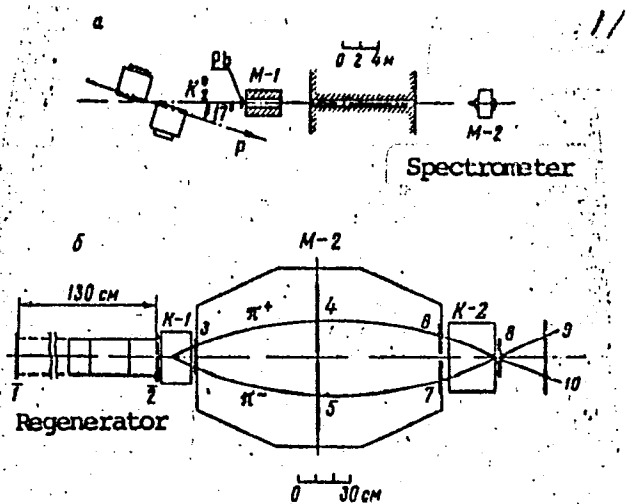
TOPIC TAGS: K meson, mass spectrometry, pion, meson interaction

ABSTRACT: In view of the discrepancies between the experimentally measured mass differences of the K_S^0 and K_L^0 mesons, the authors have measured this mass difference by a coherent regeneration method, based on measurement of the dependence of the intensity of the coherent regeneration of K_L^0 mesons in a beam of K_S^0 mesons on the thickness of the regenerator (copper or aluminum). The experiment was carried out in the ITEP 7-Gev proton accelerator (Fig. 1). The method and the apparatus are briefly described. The K_L^0 mesons were registered by means of the $K_L^0 \rightarrow \pi^+ + \pi^-$ decay with the aid of a magnetic spectrometer with scintillation counters and spark chambers. The distributions of the interaction events with respect to the masses of the decaying particle and with respect to the angle between its momentum and primary-beam directions are given. A total of 196 coherently-regenerated K_L^0 mesons were found in 375 tracks. A mass difference of 0.82 ± 0.14 ($\hbar/\tau_1 c^2$), where $\tau_1 = 0.92 \times 10^{-10}$ sec, was obtained. The distribution of the registered K_L^0 mesons had a maximum at 1.8 Gev/c and dropped to zero at 0.9 and 4 Gev/c. This result agrees well with those obtained by others

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ACC NR: AP6017591

Fig. 1. Experimental setup. a - Beam diagram, b - magnetic spectrometer diagram (the numbers denote particle counters).



using similar methods. The authors thank A. I. Alikhanov and S. Ya. Nikitin for interest in the work, L. B. Okun' and I. Yu. Kobzarev for discussions, L. L. Gol'din and his crew for operating the accelerator, and A. K. Dubasov, V. N. Markizov, N. P. Naumov, V. F. Stolyarov, V. N. Kuz'menkov, and Yu. S. Oreshnikov for help with the apparatus and the measurements. Orig. art. has: 4 figures and 1 formula.

SUB CODE: 20/ SUBM DATE: 30Jun65/ ORIG REF: 003/ OTH REF: 006

Card 2/2

8 (2)

AUTHORS:

Tayev, Ivan Sergeyevich, Candidate of SOV/161-58-4-13/28
Technical Sciences, Docent, Berezin, Vladimir Nikolayovich,
Senior Engineer

TITLE:

Experimental Examinations of the Processes During Extinguishing
a Free Alternating Current Arc (Eksperimental'noye issledovaniye
protssessov gasheniya svobodnoy elektricheskoy dugi peremennogo
toka)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Elektromekhanika i
avtomatika, 1958, Nr 4, pp 96-99 (USSR)

ABSTRACT:

Some results of examinations of the arc which forms on the
contacts of a device during the switching-off of small current
intensities (5-130 a), at voltages of 127-700 v and a
frequency of 50 c, are given here. These experiments were
carried out in the Laboratory for the Construction of
Electrical Apparatus of the MEI. The examinations were mainly
made to establish the conditions which are determined by
those parameters of the switched-off circuit and the switched-
off apparatus, where the alternating current arc is extinguished
at the first zero crossing. The diagram shown on figure 1 was
used for measuring the burning time of the arc. Figure 2

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Experimental Examinations of the Processes
During Extinguishing a Free Alternating Current Arc

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shows a diagram which gives the dependence obtained by experiment of the critical characteristic frequency f_0 of the circuit on the phase-shift angle φ at constant voltage for various amperages of the switched-off current. These curves enable choosing such parameter combinations for the circuit to be switched-off, where the extinguishing of the arc is guaranteed during a half period. Figure 3 shows the diagram for the dependence of the number of re-strikings of the arc in percent on the time of the contact opening t_p .

This curve is of a statistical character, having been obtained through numerous experiments. From the point of view of arc extinguishing, the time of contact-opening $t_p = (\frac{\pi}{2})$, which lies in the center of the half period, is most favorable. On the other hand, the opening of the contacts at a time when the current curve approaches zero, eliminates almost entirely the re-striking of the arc. The cathode oscillograms for the returning voltage obtained during the tests, allow the determination of the amplitude coefficient K_a . K_a represents

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Experimental Examinations of the Processes During
Extinguishing a Free Alternating Current Arc

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the ratio between the maximum of the returning voltage and the returning voltage with industrial frequency. If K_a and the circuit parameters are known, the remaining resistance r_s of the arc column can be determined. Based on the experiments by Professor O. B. Bron, it was found that for guaranteeing the arc erosion at high amperages, it is appropriate having not too great contact gaps. Besides, it was established that it is also appropriate for the switching-off of low amperages to have small contact gaps, which is illustrated on the diagram of figure 5. The dependence of the initial strength of the gap on the amperage to be switched-off, for various contact materials, is shown in the form of a curve on figure 6. The experiment made here, showed that repeated zero crossings can occur within the range of the examined amperages at a voltage of 220 v, provided a high characteristic frequency of the circuit (some dozen kcycles) and a great amplitude coefficient (1.5-2.0) exist, and contact materials with a small initial stress (silver-graphite, silver-tungsten, copper) are used.

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Experimental Examinations of the Processes During
Extinguishing a Free Alternating Current Arc

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At voltages of 380 v, currents below 10 a break at the first
interruption (copper contacts). There are 6 figures.

ASSOCIATION: Kafedra elektroapparatostroyeniya Moskovskogo
energeticheskogo instituta (Chair for the Construction of
Electrical Apparatus at the Moscow Institute of Power
Engineering)

SUBMITTED: July 5, 1958

Card 4/4

LEVIN, A.A.; BEREZIN, V.P.

Mechanized cutting of rolled paper and rolled cardboard. Med.prom.
16 no.4-42-44 Ap '62. (MIRA 15:8)

1. Mediko-instrumental'nyy zavod "Krasnogvardeyets".
(PAPER-CUTTING MACHINES) (MEDICAL TECHNOLOGY)

BEREZIN, V.P., inzhener; ZOTOV, G.A., inzhener.

Experience of the most efficient lumber camps. Mekh.trud.rab. 7 no.7:
5-10 JI '53. (MLRA 6:7)
(Lumber camps)

BERKIN, V.P.

KT-12 tractors with demountable crane equipment in loading lumber.
Les.prom. 14 no.1:13-15 Ja '54. (MIRA 7:1)
(Lumbering--Machinery) (Cranes, Derricks, etc.)

ZOTOV, (BEREZIN, V.P.; SHALAYEV, S.A.; KESSEL', I.V.;
PODOL'SKIY, V.A., red.

[Olenino Logging Camp] Oleninskiy lesopromyshl. Khimki,
Tsentr. nauchno issled. in-t matematitsii i energetiki
lesnoi promyshl. 1982. 30 p. (MIRA 16:4)
(Olenino region - lumbering)

BEREZIN, Vasilii Pavlovich; ZOTOV, Georgiy Aleksandrovich;
SHALAYEV, Stepan Alekseyevich; YERMOLIN, I.P., red.;
MYAKUSHKO, V.P., red.izd-va; KARLOVA, G.L., tekhn. red.

[Potentials for increasing labor productivity; from the
work practice of the Olenino Lumbering Camp] Rezervy rosta
proizvoditel'nosti truda; iz opyta raboty Oleninskogo les-
promkhoza. Moskva, Goslesbumizdat, 1963. 77 p.

(MIRA 16:12)

(Olenino (Kalinin Province))--Lumbering--Labor produktivity)

PETROV, Appolinary Stepanovich; SHILO, N.A., otv. red.; ALEKSANDROV, P.P., red.;
APPEL'TSIN, F.R., red.; BEREZIN, V.P., red.; KALABIN, A.I., red.;
KUZNETSOV, G.G., red.; MATSUYEV, L.P., red.; NUZHIDIN, I.I., red.;
POTENKIN, S.V., red.; FIRSOV, L.V., red.; FOMENKO, T.G., red.;
VANSHEYDT, N.A., red.

[Production and use of soil concrete blocks in the construction
of buildings of few stories] Proizvodstvo i primeneniye gruntoblokov
v maloetazhnom stroitel'stve Magadan, 1958. 47 p. (Magadan. Vsesoiuz-
nyi nauchno-issledovatel'skii institut zolota i redkikh metallov.
Trudy. Mestnye stroimaterialy, no.7) (MIRA 12:5)
(Soil cement) (Building blocks)

KARTASHOV, Ivanil Faylovich; SHILO, N.A., otv. red.; POTSENIN, S.V., zam. otv. red.; ALEKSANDROV, P.P., red.; APPEL'SIN, F.R., red.; BERESIN, V.P., red.; KALABIN, A.I., red.; KUZNETSOV, G.G., red.; MATSUYEV, L.P., red.; NUZHDIK, I.I., red.; FIRSOV, L.V., red.; FOMIN, T.G., red.; SHAKHINAROVICH, L.A., red.

[Principles for making geomorphological prognosis maps of placer deposits] O printsipakh postroeniia geologo-geomorfologicheskikh prognostnykh kart rossypel. Magadan, 1958. 49 p. (Magadan, Vsesoiuznyi nauchno-issledovatel'skii institut zolota i redkikh metallov. Trudy. Geologiya, no.37). (MIRA 12:4)

(Ore deposits--Maps)

GAVRIKOV, Sergei Ivanovich; SHILO, Nikolay Alekseyevich, otv.red.; POTEKIN, S.V., zam.otv.red.; ALEKSANDROV, P.P., red.; APTEL'TSIN, F.R., red.; BEREZIN, V.P., red.; KALABIN, A.I., red.; KUZNETSOV, G.G., red.; MATSUYEV, L.P., red.; NUZHDIK, I.I., red.; FIRSOV, L.V., red.; FOMENKO, T.G., red.; SHAKHNAPOVICH, L.A., red.

[Division of the upper Indigirka Valley into tectonic regions] O tektonicheskoy raionirovaniy basseina vekhnego techeniya r. Indigirki. Magadan, 1958. 17 p. (Magadan, Vsesoyuznyi nauchno-issledovatel'skii institut zolota i redkikh metallov. Trudy. Geologiya, no.38).

(MIRA 12:4)

(Indigirka Valley--Geology, Structural)

POMENKO, Timofey Grigor'yevich; SHILO, N.A., otv.red.; POTEKIN, S.V., zam.
otv.red.; ALEKSANDROV, P.P., red.; APEL'TSIN, F.R., red.; BEREZIN,
V.P., red.; KALABIN, A.I., red.; KUZNETSOV, G.G., red.; MATSUYEV, L.P.,
red.; NUZHDIN, I.I., red.; FIRSOV, L.V., red.; POMENKO, T.G., red.;
VANSHEYDT, N.A., red.

[Principles of the ore dressing process with use of concentrating
tables] Osnovy protsessa obogashchenia rud na kontsentratsionnykh
stolakh. Magadan, 1958. 35 p. (Magadan. Vsesoiuznyi nauchno-issledo-
vatel'skii institut zolota i redkikh metallov. Trudy. Obogashchenie
i metallurgiya, no.27). (MIRA 12:4)
(Ore dressing—Equipment and supplies)

FIRSOV, Lev Vasil'yevich; SHILO, N.A., otv.red.; POTEKIN, S.V., zam.otv.red.;
ALEKSANDROV, P.P., red.; APEL'TSIN, F.R., red.; BERREZIN, V.P., red.;
KALABIN, A.I., red.; KUZNETSOV, G.G., red.; MATSUYEV, L.P., red.;
NUZHDIN, I.I., red.; FOMENKO, T.G., red. (MIRA 12:4)

[Structure, morphology, and mineralization of the Igumenskoye gold deposit] Struktura, morfologiya, mineralogiya i orudnenie Igumenovskogo zolotorudnogo mestorozhdenia. Magadan, 1958. 71 p. (Magadan, Vsesoiuznyi nauchno- issledovatel'skii institut zolota i redkikh metallov. Trudy, no.33)
(Tengke Valley—Gold ores)

KALABIN, Aleksey Il'ich; SHILO, N.A., otv.red.; POTEKIN, S.V., zam.otv.red.;
ALEKSANDROV, P.P., zam.otv.red.; ALEKSANDROV, P.P., red.; APPEL'TSIN,
F.R., red.; FOMENKO, T.G., red.; BEREZIN, V.P., red.; KUZNETSOV, G.G.,
red.; MATSUYEV, L.P., red.; NUZHDIK, I.I., red.; FIRSOV, L.V., red.;
VANSHEYDT, N.A., red.

[Underground waters in the northeastern part of the U.S.S.R.] Pod-
zemnye vody Severo-Vostochna SSSR. Magadan, 1958. 85 p. (Magadan.
Vsesoiuznyi nauchno-issledovatel'skii institut zolota i redkikh metal-
lov. Trudy. Merzlotovedenie, no.9). (MIRA 12:4)
(Russia, Northern—Water, Underground)
(Frozen ground)

MANUYLOV, Pavel Ivanovich; GALKIN, Georgiy Semenovich; SHILO, N.A.,otv.red.;
POTEMKIN, S.V.,sam.otv.red.; ALEKSANDROV, P.P.,red.; APEL'TSIN, F.R.,
red.; BEREZIN, V.P.,red.; KALABIN, A.I.,red.; KUZNETSOV, G.G.,red.;
MATSUYEV, L.P.,red.; NUZHIDIN, I.I.,red.; FIRSOV, L.V.,red.;
POMENKO, T.G.,red.; SHAKHNAROVICH, L.A.,red.

[Peat lifting by means of excavating machinery in stripping
placer deposits in the Northeastern U.S.S.R.] Vskrysha torfov
zemleroiynyi mashinami na priiskakh Severo-Vostoka SSSR.
Magadan, 1958. 68 p. (Magadan. Vsesoiuznyi nauchno-issledovatel'-
skii institut solota i redkikh metallov. Trudy. Gornoe delo no.19)
(MIRA 12:5)

(Soviet Far East--Gold ores) (Peat) (Excavating machinery)

SHILO, Nikolay Alekseyevich; POTEMKIN, S.V., zam.otv.red.; ALEXANDROV, P.P.,
red.; APEL'TSIN, F.R., red.; BEREZIN, V.P., red.; KALABIN, A.I., red.;
KUZNETSOV, G.G., red.; MATSOYEV, L.P., red.; NUZHIDIN, I.I., red.;
FIRSOV, L.V., red.; POMENKO, T.G., red.; SHAKHNAROVICH, L.A., red.

[Some principles for classifying placer deposits] Nekotorye printsipy
rossypnykh proiavlenii. Magadan, 1958. 20 p. (Magadan, Vsesoiuznyi
nauchno-issledovatel'skii institut solota i redkikh metallov. Trudy,
Geologiya, no. 36). (Ore deposits--Classification) (MIRA 12:4)

RED'KIN, V.K.; POTEMKIN, S.V., glavnyy red.; MATSUYEV, L.P., zamestitel' glavnogo red.; SHAKHNAROVICH, L.A., red.; BEREZIN, V.P., red.; VESELOV, V.V., red.; GOLANDSKIY, D.B., red.; GOL'DTMAN, V.G., red.; IGNATENKO, M.A., red.; SHASHURA, M.V., red.; RIVKIN, G.M., red.; FIRSOV, L.V., red.; SHEPELEV, I.T., red.

[Grounding and protective cutting-off in underground workings of permafrost placer deposits.] Zazemleniia i zashchitnye otkliucheniia pri podzemnoi razrabotke mnogoletnemerzlykh rossypei. Magadan, Vses. nauchno-issl. in-t zolota i redkikh metallov, 1962. 26 p. (Magadan, Vsesoiuznyi nauchno-issledovatel'skii institut zolota i redkikh metallov. Trudy, Gornoe delo, no.40) (MIRA 16:6)

(Kolyma Valley—Electric protection)
(Kolyma Valley—Placer deposits)

SHOROKHOV, Sergey Mikhaylovich, prof., doktor tekhn. nauk; SEOROVSKIY, V.V.;
BEREZIN, V.P., retsenzent; KUDRYASHEV, V.A., kand.
tekhn. nauk, retsenzent; DIDKOVSKIY, D.Z., otv. red.; KIT, I.K.,
red.izd-va; MAKSIMOVA, V.V., tekhn. red.

[Working placer deposits and the principles of planning] Raz-
rabotka rossypnykh mestorozhdenii i osnovy proektirovaniia.
Moskva, Gosgortekhzdat, 1963. 764 p. (MIRA 16:10)

1. Zamestitel' predsedatelya Severo-Vostochnogo sovnarkhosa
(for Berezin). 2. Irkutskiy politekhnicheskii institut (for
Kudryashev).

(Hydraulic mining)

ANDRIANOV, Aleksandr Alekseyevich; POTEKIN, S.V., glavnyy red.;
MATSUYEV, L.P., zamestitel' glavnogo red.; SHAKHNAROVICH, L.A.,
red.; BEREZIN, V.P., red.; VESELOV, V.V., red.; GOLANDSKIY, D.B.,
red.; GOL'DTMAN, V.G., red.; IGNATENKO, M.A., red.; SHASHURA, M.V.,
red.; RIVKIN, G.M., red.; FIRSOV, L.V., red.; SHEPELEV, I.T.

[Methods of analytic decomposition of cassiterite and tin ores]
Metody analiticheskogo razlozheniya kassiterita i rud olova.
Magadan, 1962. 14 p. (Magadan. Vsesoyuznyi nauchno-issledo-
vatel'skii institut zolota i redkikh metallov. Trudy Obogashcheni-
i metallurgii, no.53). (MIRA 16:7)

(Cassiterite--Analysis) (Tin ores--Analysis)

KASHTANOV, I.N., glav. red.; BEREZIN, V.P., red.; IOSIFOVICH,
N.L., red.; POTEKIN, S.V., red.; SHILO, N.A., doktor
geol.-miner. nauk, prof., red.; FROLOVA, M.F., red.

[10 years of Magadan Province] 10 let Magadanskoi oblasti.
Magadan, Magadanskoe knizhnoe izd-vo, 1963. 210 p.

(MIRA 17:8)

1. Direktor kompleksnogo nauchno-issledovatel'skogo insti-
tuta Sibirskogo otdeleniya AN SSSR (for Shilo). 2. Direktor
nauchno-issledovatel'skogo instituta zolota i redkikh me-
tallov (for Potemkin). 3. Sekretar' oblastnogo komiteta
KPSS (for Kashtanov).

BEREZIN, V.P.

(Tomsk)

Results of the study on the health of nursing infants in relation to their living conditions. Sov. zdrav. 21 no.9:30-34
*62 (MIRA 17:4)

1. Iz kafedry organizatsii zdravookhraneniya i istorii meditsiny (zav. - prof. N.P. Fedotov) Tomskogo meditsinskogo instituta (rektor - prof. I.V. Toroptsev).

AUTHOR: BEREZIN, V.S., GROSHEV, L.V., DIKAREV, V.S., PA - 2254
EGIAZAROV, M.B., KOROLEV, E.N., MADEEV, V.G., NIKOLEYEV, YU.G.

TITLE: The Spatial Distribution of the Flows of μ -Rays and of Slowed-down Neutrons in the Graphite Column of a Physical-Technical Reactor. (Prostranstvennoye razpredeleniye potokov μ -luchey i zamedlyayu sochikh neytronov v grafitovoy kolonne reaktora RFT, Russian).

PERIODICAL: Atomnaya Energiya, 1957, Vol 2, Nr 2, pp 118 - 122 (U.S.S.R.)

ABSTRACT: This distribution was investigated in spring 1953. The results obtained are suited also as experimental material for controlling the theory as well as for the computation of the spatial distribution of μ -rays and slowed down neutrons.
Experimental details: The thermal column (of graphite) of this reactor has a cross section of $100 \times 100 \text{ cm}^2$ and a length of 200 cm. This column is separated from the active zone of the apparatus by an 80 cm thick graphite reflector and by a 45 cm thick layer of air and the sidewalls are surrounded by concrete. An experimental channel leads along the axis of the column, which is filled with graphite rods. The indicators were irradiated in the cavities of these graphite rods. The development of the density of thermal neutrons in graphite was measured by a dys-

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PA - 2254

The Spatial Distribution of the Flows of γ -Rays and of Slowed-down Neutrons in the Graphite Column of a Physical-Technical Reactor.

prosium indicator. As an indicator of the resonance neutrons, Indium surrounded by cadmium, gold and Iodine were used. Measurements were carried out when reactor operation had become steady. Measuring results of the spatial dispersion of the neutron fluxes of different energies in graphite are shown in form of diagrams. The neutron flux is diminished much more at the beginning of the thermal column than at its end. The curves of the reduction of the neutron fluxes change noticeably at a distance of from 160 to 180 cm. The fluxes of the resonance neutrons and of the fast neutrons are exponentially attenuated. The course of the curve of the density of thermal neutrons is described quite accurately by an exponential relation with the relaxation length $L = 21,6 \pm 0,1$ cm. Also the decrease of the dosage of γ -rays in a graphite column is shown in a diagram.

Discussion of the results: In the asymptotic domain spatial and energy distribution of the slowed down neutrons is determined by that energy which corresponds to maximum scattering length. At great distances (> 180 cm) the resonance neutrons are probably produced by penetrating of fast neutrons. The spatial

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The Spatial Distribution of the Flows of γ -Rays and of Slowed
down Neutrons in the Graphite Column of a Physical-Technical
Reactor.

distribution of fast neutrons then determines the spatial dis-
tribution of resonance neutrons. The experimental results ob-
tained here are essentially a confirmation of the theory.
(5 illustrations).

ASSOCIATION: Not given.
PRESENTED BY:
SUBMITTED: 17.5.1956.
AVAILABLE: Library of Congress.
Card 3/3

BEREZIN, Ye.N., inzh.

Determination of the maximum acceleration of ingot cars.
Izv.vys.ucheb.zav.; chern.met. 2 no.7:111-117 J1 '59.
(MIRA 13:2)

1. Ural'skiy politekhnicheskiy institut. Rekomendovano
kafedroy mekhanicheskogo oborudovaniya metallurgicheskikh
zavodov Ural'skogo politekhnicheskogo instituta.
(Railroads, Industrial--Electric driving)
(Metallurgical plants--Equipment and supplies)

BEREZIN, Ye.N., aspirant

Maximum-load cycle in the electric drive of an ingot car.

Trudy Ural.politekh.inst. no.101;116-123 '60. (MIRA 14;3)

(Rolling (Metalwork)) (Feed mechanisms)

PAL'MOV, Ye.V., prof., doktor tekhn.nauk; BEREZIN, Ye.N.; aspirant

Intensifying the operation of ingot cars. Trudy Ural.politekh.
inst. no.101:6-12 '60. (MIRA 14:3)
(Rolling (Metalwork)) (Feed mechanisms)

VYDRIN, V.N., kand.tekhn.nauk; BEREZIN, Ye.N., inzh.; KHMICH, G.I.;
TRET'YAKOV, A.V.; FEDOROV, M.I.; VASHCHENKO, Yu.I.

"Mechanical equipment of rolling mills" by A.A. Koroleva. Re-
viewed by V.N. Vydrin and others. Stal' 22 no.1:61-63 Ja '62.
(MIRA 14:12)

- 1.- Chelyabinskiy politekhnicheskii institut (for Vydrin, Berezin).
2. Nauchno-issledovatel'skiy konstruktorsko-tekhnologicheskii
institut tyazhelogo mashinostroyeniya Uralmashzavoda i Ural'skiy
politekhnicheskii institut (for Khimich, Tret'yakov, Fedorov).
(Rolling mills--Equipment and supplies)
(Koroleva, A.A.)

BEREZIN, Ye. N., insh.

New diagrams of high productivity ingot feed. Trudy Ural'.
politekh. inst. no. 119:16-21 '62. (MIRA 16:1)

(Rolling mills—Equipment and supplies)
(Steel ingots—Transportation)

L 18365-63

LJP(C)/SSD

ACCESSION NR: AP3003946

EWT(1)/EWG(k)/BDS/EEC(b)-2/ES(w)-2
Pz-4/Pab-4/P1-4/Pe-4 AT

AFPTC/ASD/ESD-3/AFWL/

S/0057/63/033/007/0788/0794

AUTHOR: Berezin, Yu.A.

TITLE: Normal oscillations of a plasma ellipsoid in a uniform magnetic field

SOURCE: Zhurnal tekhnicheskoy fiziki, v.33, no.7, 1963, 788-794

TOPIC TAGS: plasma oscillation, magnetic field plasma

ABSTRACT: The frequency spectrum of the normal electromagnetic oscillations of a plasma in the shape of an ellipsoid of revolution located in a uniform magnetic field parallel to the axis of symmetry is investigated by a method developed in connection with ferromagnetic resonance by L.R.Walker (Phys.Rev., 105, 390, 1957). The plasma ellipsoid is assumed to have a constant density and to be separated from the vacuum by a sharp boundary, deformations of which are neglected. The dielectric tensor is assumed to provide an adequate description of the electromagnetic properties of the plasma. The frequency spectrum is found to be discrete. It is discussed in some detail, and its dependence on the strength of the external magnetic field and on the shape of the ellipsoid is illustrated with curves and

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L 18365-63

ACCESSION NR: AP3003946

charts. As the ellipsoid degenerates to a disc, three condensation points develop in the spectrum. A fourth condensation point found for a disc by V.G.Bar'yakhtar, M.I.Kaganov (ZhTF, 32, 554, 1962) is not obtained. /Abstracter's note: No explanation of this discrepancy is offered. The dispersion equation from which the normal frequencies are obtained is generalized to the case in which the motion of the ions is not neglected. "In conclusion, I express my deep gratitude to M.I. Kaganov for suggesting the topic, for valuable advice, and for kindly permitting me to examine his paper prior to publication." Orig.art.has: 26 formulas and 6 figures.

ASSOCIATION: none

SUBMITTED: 22 July 62

SUB CODE: PH MM

DATE ACQ: 07 Aug 63

NO REF SOV: 001

ENCL: 00

OTHER: 002

Card 2/2

S/0057/64/034/003/0448/0453

ACCESSION NR: AP4020571

AUTHOR: Berezin, Yu.A.; Gutkin, T.I.; Lozovskiy, S.N.; Soldatenkov, T.R.

TITLE: Interaction of a plasma with high frequency fields in the presence of a constant magnetic field

SOURCE: Zhurnal Tekhnicheskoy fiziki, v.34, no.3, 1964, 448-453

TOPIC TAGS: plasma, plasma in alternating field, extraordinary wave, plasma in microwave field, skin effect

ABSTRACT: The interaction of an axially symmetric plasma in a uniform longitudinal magnetic field with an axially symmetric high frequency electromagnetic field is discussed theoretically. The high frequency field is assumed to consist of a longitudinal magnetic field and a transverse electric field (extraordinary wave). The case of a longitudinal high frequency electric field and an azimuthal magnetic field has been previously discussed by others (H.A.Boot, S.A.Self and R.B.R. Shersby-Harvie, J.Elec.Contr., 5, 435, 1958; E.S.Weibel, Ibid. 5, 435, 1958). The motion of the ions and electrons is separated into a rapid component having the frequency of the applied alternating field and the slow component that remains after averaging over a period

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ACC.NR: AP4020571

of the alternating field. The system is described by the two-fluid hydrodynamic equations and Maxwell's equations. Longitudinal and transverse temperatures and pressures are distinguished. In the "zeroth approximation", quasineutrality is assumed and the non-linear hydrodynamic terms, the pressure gradients, and the Lorentz forces due to the magnetic component of the variable field are neglected. To these zeroth approximation equations is adjoined the sum of the "first approximation" equations of motion averaged over a period of the high frequency field. From the resulting equations the particle velocities and two of the three components of the alternating field are eliminated. Two differential equations are thus obtained for the plasma density and the azimuthal electric field as functions of the distance from the symmetry axis. These equations were integrated numerically for several values of the parameters, and some of the results are presented graphically. There are two resonant frequencies. For sufficiently dense plasmas these frequencies are approximately the Langmuir frequency and the geometric mean of the ion and electron Larmor frequencies. When the frequency of the applied field is larger than the mean Larmor frequency, the plasma density increases and the alternating field decreases with approach to the symmetry axis. The mathematical simplification that results when the skin penetration depth is small compared with the radius of the plasma filament is discussed briefly. When the applied frequency is smaller than the mean Larmor

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ACC.NR. AP4020571

frequency, the extraordinary wave penetrates the plasma. In this case the azimuthal electric field amplitude is an oscillatory function of distance from the axis, and the plasma density increases, with superposed oscillations, as the distance from the axis is increased. The criterion for the validity of the approximations employed is that the electron velocity be small compared with the product of the frequency of the applied field and a characteristic length which may be either the skin penetration depth or the wavelength. "In conclusion the authors express their gratitude to R.A.Demirkhanov for his interest in the work and for discussions." Orig.art.has: 20 formulas and 4 figures.

ASSOCIATION: none

SUBMITTED: 31Jan63

DATE ACQ: 31Mar64

ENCL: 00

SUB CODE: PH

NR REF SOV: 003

OTHER: 002

Card 3/3

ACCESSION NR: AP4040320

S/0057/84/034/008/1124/1128

AUTHOR: Berezin, Yu.A.

TITLE: Low frequency resonant oscillations of an ellipsoidal plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.6, 1964, 1124-1126

TOPIC TAGS: plasma, plasma oscillations, plasmaoid, plasma-magnetic field interaction

ABSTRACT: The author has previously discussed the oscillations of a spheroidal plasma in a uniform magnetic field parallel to the axis (ZhTF 33, 788, 1963). The problem was treated in the quasistatic approximation (wavelength long compared with the dimensions of the plasma) and the motions of the ions were neglected (frequency large compared with the ion Larmor frequency). He also derived the relevant dispersion equation with the motions of the ions taken into account. In the present note the solutions of this dispersion equation are discussed for frequencies that are small compared with the electron Larmor frequency but not necessarily small compared with the ion Larmor frequency. Most, but not all, of the notation is explained; one might hope to find the missing definitions in the earlier paper. The resonant

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51"
ACCESSION NR: AP4040320

frequencies are characterized by two intergers: the "principal" number n , and the "azimuthal" number m . For fixed n and $|m|$, the resonant frequency for positive m increases monotonically with the magnetic field. For negative m there are two resonant frequencies, of which the first is very close to the ion Larmor frequency and the second remains always greater than the resonant frequency for positive m . The second resonant frequency for negative m rises to a maximum at the magnetic field for which the electron Larmor frequency is equal to the Langmuir frequency, and decreases with further increase of the magnetic field. For fixed magnetic field and increasing n , the resonant frequencies for negative m have two "condensation" points, of which one is the ion Larmor frequency and the other may fall outside the low frequency region. As the spheroid changes shape from a disc toward a sphere, the second resonant frequency for negative m increases monotonically. Orig.art.has: 5 formulas and 3 figures.

ASSOCIATION: none

SUBMITTED: 22Apr63

DATE ACQ: 19Jun64

ENCL: 00

SUB CODE: ME

NR REF SOV: 001

OTHER: 000

Cord 2/2

BEREZIN, Yu.A.; KARPMAN, V.I.

Theory of nonstationary waves of finite amplitudes in a rarefied plasma. Zhur. eksp. i teor. fiz. 46 no.5:1880-1890 My '64.
(MIRA 17:6)

1. Novosibirskiy gosudarstvennyy universitet.

BEREZIN, Yu.A.

Low-frequency natural oscillations of a plasma ellipsoid.
Zhur. tekhn. fiz. 34 no.6:1124-1126 Je '64. (MIRA 17:9)

DUBOVY, L.V.; BEREZIN, Yu.A.

Choice of optimum parameters for a relativistron plasma accelerator.
Zhur. tekhn. fiz. 34 no.10:1867-1870 Q 1964.

(MIRA 17:12)

SHREIN, Yu.A.; KARPMAN, V.I. (Novosibirsk)

Theory of nonstationary surface waves. SMTF no.5:135-137
S-O '64.

(MIRA 18:4)

13000-00 INT(11)/ETG(P)/EPR(a)-2/ENG(m) LIP(c) AT

ACC NR: AP8002354

SOURCE CODE: UR/0207/65/000/006/0026/0032

AUTHOR: Berezin, Yu. A. (Novosibirsk)

ORG: none

TITLE: Waves of finite amplitude in a hot plasma

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 6, 1965, 26-32 *21.44.55*

TOPIC TAGS: shock wave propagation, high temperature plasma, low temperature plasma, rarefied plasma, *magnetic field, motion equation*

ABSTRACT: The author studies the structure of a plane shock wave of arbitrary force propagating in a hot rarefied plasma across a magnetic field. The problem of the propagation of unsteady waves of finite, but small amplitude is examined under the same conditions. The author also considers waves of finite amplitude in a cold rarefied plasma. The profile of such waves is formed under the effect of nonlinear and dispersion effects, the latter being caused by the inertia of the electrons and anisotropy of the plasma. A system of equations is used consisting of the equation of motion of the electron and ion components of plasma, the discontinuity equation, and Maxwell equations. The plasma is assumed to be quasineutral. The author introduces into the equation of motion the gas-kinetic pressure which is of a tensor nature since the distribution of ions does not have spherical symmetry. In conclusion, author thanks R. Z. Sagdeyev and N. N. Yanenko for a discussion of the work, and R. N. Makarov

Card 1/2

ACC NR: AP8002354

for assistance in the numerical calculations. Orig. art. has: 23 formulas.

SUB CODE: 20 / SUBM DATE: 15Jun65 / ORIG REF: 004

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2/2

L 5387-66

ACC NR: AP5027279

EWI(1)/ETC/EPF(n)-2/EWG(m)/EPA(w)-2 IJP(c) AT

SOURCE CODE: UR/0207/65/000/005/0116/0118

AUTHOR: Berezin, Yu. A. (Novosibirsk)

ORG: none

TITLE: Finite amplitude cylindrical waves in rarefied plasma

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 5, 1965, 116-118

TOPIC TAGS: rarefied plasma, cylindric wave, magnetic field, magnetic pressure

ABSTRACT: The propagation of unsteady cylindric waves in rarefied cold plasma under a strong magnetic field is investigated. The plasma is assumed to be quasi-neutral, the gas dynamic pressure is neglected in comparison to the magnetic pressure, and no collisions exist between particles. At time $t = 0$, the uniform cylindrical plasma of radius "a" and density N is subjected to strong magnetic field H_0 directed along its axis. The resulting displacement is described by a set of five equations, three describing the plasma motion along three axes and two describing the magnetic induction. The boundary conditions are given by

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L 5387-66

ACC NR: AP5027279

$$u(0, \tau) = v(0, \tau) = 0, h_1(0, \tau) = 0, \frac{\partial h_1}{\partial \xi}(0, \tau) = 0, h_2(1, \tau) = 0, h_1(1, \tau) = 1 + A f(\tau) \\ h_2(1, \tau) = 1 + A f(\tau) \quad (A = \text{const})$$

and the initial conditions by

$$x(\xi, 0) = \xi, \quad u(\xi, 0) = v(\xi, 0) = w(\xi, 0) = h_1(\xi, 0) = 0, \quad h_2(\xi, 0) = 1 + A f(0) = 1$$

where $f(T)$ is a given function of time. The solution is obtained numerically and the results shown graphically. The first of these depicts the propagation of magnetic disturbances along the plasma axis for small times. These exhibit an oscillatory character. The second shows the wave profiles at intermediate times. The longer the dispersion length, the larger is the oscillation. The fundamental wave front moves at the Alfvén speed. In conclusion, the author thanks R. Z. Sagdeev, V. I. Karpman, N. N. Yanenko, and Yu. Ye. Nesterikhin for consultation and discussions and G. A. Gerasimov for helping in the numerical computations. Orig. art. has: 4 figures and 3 equations.

SUB CODE: ME, EM

SUBM DATE: 01Feb65/

ORIG REF: 006/

OTH REF: 005

CC
Card 2/2

L 31545-66 EWT(1)/ETC(f) IJP(c) AT

ACC NR: AP6009056 SOURCE CODE: UR/0207/66/000/001/0107/0110

AUTHOR: Berezin, Yu. A. (Novosibirsk)

ORG: none

TITLE: Cylindrical waves propagating across a magnetic field in a rarefied plasma

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 1, 1966, 107-110

TOPIC TAGS: cylindric wave, plasma wave propagation, plasma wave, rarefied plasma

ABSTRACT: The profile of waves of finite amplitude in a rarefied plasma is determinable by two conflicting processes: nonlinear twisting and "smearing" due to dispersion effects. For waves propagating across a magnetic field in a cold rarefied plasma the dispersion law is such that the phase velocity of small oscillations decreases with decreasing length of the wave. Such a dispersion law leads to the possibility of the existence of stationary "compression" waves of finite amplitude (isolated and periodic). Some authors have investigated nonstationary plane waves moving across a magnetic field induced by increasing magnetic pressure on the plasma-vacuum boundary. The present author applies numerical integration of the corresponding equation system to the investigation of cylindrical waves propagating in a cold rarefied plasma across a high-intensity magnetic field. The results are important for experiments on rapid compression of plasma columns by a magnetic field under conditions when the plasma may be considered sufficiently rarefied as described by A. M.

Cord 1/2

E 31545-66

ACC NR: AP6009056

Iskol'dskiy, R. Kh. Kurtmullayev, Yu. Ye. Nesterikhin, and A. G. Ponomarenko
(Eksperimenty po besstolknovitel'noy udarnoy volne v plasme. Zh. eksperim. i teor. fiz.,
1964, vol. 46, No. 8). The author thanks R. Z. Sagdeyev and N. N. Yanenko for valuable
consultations and discussions, as well as G. A. Maksimey and Ye. A. Tsvetov for assistance
in the work. Orig. art. has: 2 figures and 9 formulas.

SUB CODE: 20 / SUBM DATE: 22Mar65 / ORIG REF: 004 / OTH REF: 003

Card

2/2 LC

ACC NR: AP6013915

SOURCE CODE: UR/0207/66/000/002/0003/0006

AUTHOR: Berezin, Yu. A. (Novosibirsk); Sagdeyev, R. Z. (Novosibirsk)

ORG: none

TITLE: Theory of nonlinear waves in a plasma

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 2, 1966, 3-6

TOPIC TAGS: plasma physics, plasma magnetic fluid, ion, shock wave, electron, plasma wave

ABSTRACT: The authors study nonlinear waves propagating across a magnetic field in a cold rarefield quasineutral plasma consisting of electrons and two types of ions. Dispersion curves are given for low amplitude waves in a three-component plasma (see figure 1). The lower branch of the dispersion curve describes nonlinear waves at relatively low velocities. As velocity increases, the upper branch of the curve describes nonlinear wave profiles. Electron velocity is determined by drift approximation. An expression is given for the velocity of an isolated wave in terms of the maximum magnetic field in the wave. A figure is given showing this relationship for various relative ion concentrations (see figure 2). The lower the concentration of light component in the plasma the greater is the deviation from linearity. The lower velocity limit of the wave is equal to the speed of sound and the upper limit is equal

Card 1/3

L 26762-66

ACC NR: AP6013915

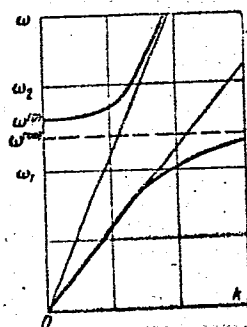


Fig. 1.

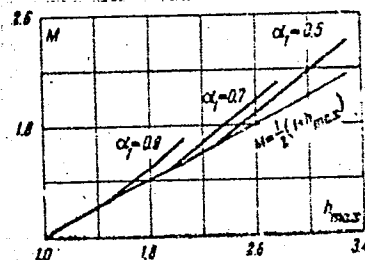


Fig. 2.

to the phase velocity of low oscillation at high frequencies. As the wave approaches the upper limit the light component drops out. Dispersion effects which compensate nonlinear spiraling appear at higher frequencies due to electron inertia. The critical velocity of the wave and the maximum magnetic field in the wave decrease with the reduction in concentration of the light component. The ion energy in the wave is estimated. It is shown that light ions are accelerated in a direction perpendicular to the wave motion when an isolated wave passes through a three-component plasma.

Card 2/3

L 26762-66

ACC NR: AP6013915

If friction between the plasma components is introduced into the original calculations, the result is a shock wave having an oscillator structure with a steep front. A profile is given for such a wave (see figure 3).

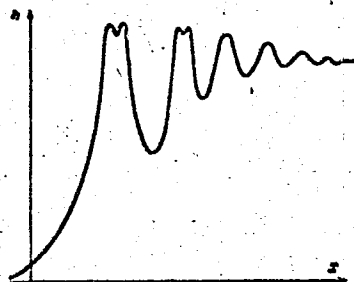


Fig. 3.

Orig. art. has: 4 figures, 4 formulas.

SUB CODE: 20/

SUBM DATE: 29Oct65/

ORIG REF: 003/

OTH REF: 001

Card 3/3 *KV*

L 40901-66 EWP(m)/EWT(1) IJP(c) AT/WW

ACC NR: AP6020549

SOURCE CODE: UR/0414/66/000/001/0003/0028

AUTHOR: Berezin, Yu. A. (Novosibirsk); Kurtmullayev, R. Kh. (Novosibirsk);
Nesterikhin, Yu. Ye. (Novosibirsk)

ORG: none

TITLE: Collisionless shock waves in a rarefied plasma

SOURCE: Fizika gorennya i vzryva, no. 1, 1966, 3-28

TOPIC TAGS: plasma shock wave, shock wave front, shock wave analysis, rarefied plasma, shock wave structure

ABSTRACT: The author discusses the theory of the structure of shock waves, dispersion effects, shock waves with an oscillatory structure, collisionless dissipation, shock waves with an aperiodic profile, conditions for exciting waves, devices used to excite strong shock waves, the basic method of plasma diagnosis, dynamics of cylindrical waves, and the structure of a shock wave and physical phenomena at the front. The problem of shock waves includes a wide scope of physical phenomena such as dispersion of plasma oscillations, microscopic instabilities, collisionless damping, and others. The interest shown in collisionless shock waves is to a considerable extent due to the fact that instabilities developing at the wave front and the

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UDC: 532.593+533.9.07

L 40901-66

ACC NR: AP6020549

phenomenon of the so-called "reversal" of strong shock waves can lead to an effective dissipation of energy and heating of plasma. The indicated phenomena are also of value for understanding processes occurring in the interplanetary medium, for example the interaction of the solar wind with the geomagnetic field. Unfortunately, the structure of a shock wave and its width has still not been investigated in space experiments, but apparently this will be done in the near future owing to the increasing volume of work being performed on satellites and rockets. Orig. art. has: 14 figures and 11 formulas.

SUB CODE: 20/ SUBM DATE: 16Dec65/ ORIG REF: 021/ OTH REF: 017

me
Card 2/2

ACC NR: AP7000636

SOURCE CODE: UR/0414/66/000/003/0003/0011

AUTHOR: Berezin, Yu. A. (Novosibirsk); Kurtmullayev, R. Kh. (Novosibirsk)

ORG: none

TITLE: Cylindrical waves in a diluted plasma in presence of strong collisionless dissipation

SOURCE: Fizika gorennya i vzryva, no. 3, 1966, 3-11

TOPIC TAGS: plasma magnetic field, plasma shock wave, rarefied plasma

ABSTRACT: A study of collisionless shocks propagating in laboratory plasmas is reported. A cylindrical symmetric two-fluid system subjected to externally applied magnetic fields varying sinusoidally is considered theoretically. The numerical solutions obtained for the magnetic field distribution in the plasma at various times show that this model is sufficient to account for the experimentally observed field structure if an arbitrary constant dissipation is assumed. This work allows one to establish regions in which the wave is formed, becomes quasistationary and changes over to a flow with rapidly increasing field near the plasma axis. It is also shown that the magnetic piston behind the wave front determines the behavior of the wave, influencing strongly the ratio of the magnetic field at a particular phase to that of the plasma density. A table of plasma parameters sufficiently varying is provided, allowing the application-

UDC: 532.593+533.9.07

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ACC NR: AP7000636

of the results of this study to laboratory plasmas that are not collision-dominated. Discussion of the dissipation on the wave structure shows the importance of collective effects which must be assumed to explain experimental results. Orig. art. has: 8 figures, 8 formulas.

SUB CODE: 20/

SUBM DATE: 19Apr66/

ORIG REF: 004/

OTH REF: 002

Card- 2/2

ACC NR: AP6037086

SOURCE CODE: UR/0056/66/051/0057/1557/1568

AUTHOR: Berezin, Yu. A.; Karpman, V. I.

ORG: Novosibirsk State University (Novosibirskiy gosudarstvennyy universitet)

TITLE: Nonlinear evolution of disturbances in plasmas and other dispersive media

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 5, 1966, 1557-1568

TOPIC TAGS: plasma instability, plasma wave propagation, plasma magnetic field, nonlinear plasma, asymptotic solution

ABSTRACT: This is a continuation of earlier work (ZhETF v. 46, 1880, 1964), in which a formula of the type first given by D. J. Korteweg and G. de Vries (Phil. Mag. v. 39, 442, 1895) was derived for the case of waves propagating in a plasma at an angle to the magnetic field. In the present paper the authors clarify some characteristic features of different types of the solutions obtained when such an equation is used to describe the evolution of nonlinear disturbances in a plasma or in other dispersive media. The condition for the decay of the disturbances into various types of solutions are obtained. A similarity principle is formulated for the Korteweg-de Vries equation and the physical meaning of self-similar solutions of this equation is explained. Some general asymptotic relations are obtained for nonstationary solutions.

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ACC NR: AP6037086

Particular attention is paid to the case when the solution consists of an individual peak (soliton) and a "tail" representing a limited wave packet of small amplitudes. Conditions under which non-soliton solutions are obtained, and under which the initial perturbation breaks up into a smaller or a larger number of solitons are determined. Certain qualitative peculiarities of the "pure-soliton" solutions are explained. Orig. art. has: 4 figures and 41 formulas.

SUB CODE: 20/ SUBM DATE: 11Jun66/ ORIG REF: 005/ OTH REF: 007

Card 2/2

KOROTKEVICH, Aleksandr Timofeyevich; BEREZKIN, Yu.I., red.;
KISLYAKOVA, M.N., tekhn. red.

[In battle and at work always ahead; on the history of the
Miasnikov Car Repair Plant] V boiakh i trude - vezde vpered; k istorii VRZ im. Miasnikova. Minsk, Izd-vo M-va vysshego, srednego spetsial'nogo i professional'nogo obrazovaniia ESSR, 1962. 41 p. (MIRA 16:6)
(Minks--Railroads--Cars)

REVAZASHVILI, B.I.; RYNDIN, A.N.; BEREZIN, Yu.L.

Testing a sound-ranging regulator for the automatic control of
mill charging at the Tekeli ore dressing plant. TSvet.met. 35
no.12:8-12 D '62. (MIRA 16:2)
(Tekeli--Crushing machinery). (Automatic control)

BEREZIN, Yu.L., inzh.; DZYGALO, V.I., inzh.

Automatic measurement of the quantity of solid substance in the
pulp. Mekh. i avtom. proizv. 18 no.9:14 S '64.

(MIRA 17:11)

AUTHORS: Drachev, L.A., and Berezin, Yu.V.

TITLE: Influence of the Large Irregularities of the F_2 -layer
on its Radio Wave Reflection Coefficient (Vliyaniye
bol'shikh neodnorodnostey sloya F_2 na koeffitsiyent
otrazheniya radiovoln)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.II, No.10,
pp. 1234 - 1239 + 1 plate(US\$)

ABSTRACT: A strict solution of the problem of the reflection of radio waves from a horizontally non-homogeneous, ionospheric layer is rather complicated, but it is possible to make a quantitative estimate of the amplitude and phase of the reflected wave by means of a comparatively simple theory. For this purpose, it is assumed that the phase of the reflected wave is determined by the length of the ray and the amplitude is given by the curvature of the surface at the point of the reflection. The reflecting surface is in the form of a sinusoidal cylinder, described by Eq.(1) where h is the average height of the reflecting surface, α is the amplitude or the vertical dimension of the irregularity, $p = 2\pi/\Delta$ is the wave number and Δ is the horizontal dimension of the irregularity. Under the above assumptions, it is shown that the change in

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Influence of the Large Irregularities of the F_2 -layer on its Radio Wave Reflection Coefficient.

the distance between the observation point and the reflection point of the n -th ray at $\Delta r_n = r_n - h$, is expressed by:

$$\frac{\Delta r_n}{a} = \sin \xi + \frac{\chi}{2} \cdot \cos^2 \xi \quad (2)$$

where $\xi = p(x + x_0)$ and $\chi = ap^2 h$. On the other hand, the relative change in the amplitude of the reflected wave is expressed by:

$$A_1 = \frac{1}{1 + \chi \sin \xi} \quad (4)$$

From Eqs. (2) and (4), it is possible to determine the phase and the amplitude of the field at the observation point. The amplitude of the second reflection is also of some interest, but this can only be determined at the points where the radius of curvature of the reflecting surface is $Q = \pm \frac{1}{ap^2}$.

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Influence of the Large Irregularities of the F₂-layer on the
Wave Reflection Coefficient.

The above theory was checked experimentally by means of an equipment which permitted the simultaneous measurement of the phase and the amplitude of the primary and secondary reflected signals. The amplitudes could be measured with an accuracy of about 10%, so that the reflection coefficient could be determined with an accuracy of 20%. The experimental observations of the two amplitudes and the phase were recorded photographically (see Fig.3). From the analysis of the above, it was found that 89% of the maxima of the amplitudes of the first reflection and 92% of the amplitude maxima of the secondary reflection coincided with the maxima of the phase displacement. The calculated reflection coefficient gives values ranging from 0.25 to 5.4. Where the reflection coefficient was greater than unity, the phase variation was a maximum (85% of the cases). This seems to indicate that such anomalous values of the coefficient are due to large irregularities. There are 5 figures and 5 references, 1 of which is Slavic.

ASSOCIATION: Physics Faculty of the Moscow State University imeni
M.V. Lomonosov. (Fizicheskiy Fakul'tet Moskovskogo
gosudarstvennogo Universiteta im. M.V. Lomonosova)

Card 3/4

Influence of the Large Irregularities of the F₂-layer on its Radio
Wave Reflection Coefficient.

SUBMITTED: July 5, 1956.

AVAILABLE: Library of Congress.

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3(6), 3(7)

AUTHORS:

SOV/20-123-5-13/50
Gusev, V. D., Drachev, L. A., Mirkotan, S. F., Berezin, Yu. V.,
Kiyanovskiy, M. P., Vinogradova, M. B., Gaylit, T. A.

TITLE:

The Structure and the Motions of Large-Scale Inhomogeneities
in the Ionosphere Layer F_2 (Struktura i dvizheniya krupnykh
neodnorodnostey v ionosfernom sloye F_2)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 5, pp 817-820
(USSR)

ABSTRACT:

The authors invented an integral phase method for the recording of great inhomogeneities and their motions. This method is free from the deficiencies of other methods and consists of the recording of the variations of the phase way of the reflected signal. For small inhomogeneities, these variations are of the order 2π , and for large-scale inhomogeneities - of the order 40 - 200 π . This method has a high precision (which amounts to dozens of meters) and a high resolving power. This permits the use of statistical methods in the investigation of large-scale inhomogeneities. The apparatus for the recording of phase variations consists

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SOV/26-123-5-15/50

The Structure and the Motions of Large-Scale Inhomogeneities in the
Ionosphere Layer F_2

of receiving and transmitting ionosphere stations with phase indicators and photoindicators. The phase variations are recorded on a cinematographic film. The authors used 3 recording apparatus placed in 3 points of the Earth's surface, these points formed a triangle of 30 - 40 km side length. In each of these points the variations of the phase of the reflected signal were recorded. In this way, the authors found a regular smooth curve for $\phi_p(t)$ on which random-character variations

$\phi(t)$ (which are due to the presence of inhomogeneities and their motions in the ionosphere) are superimposed. The term $\phi_p(t)$ is due to the variation of the height distribution of the ionization of the ionospheric layers from day to night. A suitable utilization of the results permits a separation of ϕ_p and ϕ . (These 2 quantities are not exactly defined in this paper). An analysis of the behavior of $\phi(t)$ gives data concerning the dimensions, the shape, and the motions of the inhomogeneities. The following parameters were found: The velocity V_d of the horizontal drive in the ionosphere and

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The Structure and the Motions of Large-Scale Inhomogeneities in the Ionosphere Layer F_2

its direction which is determined by the angle β ; the average shape of the ionosphere inhomogeneities which is determined by the "characteristic ellipse"; the radius of correlation and the spatial dimensions of the inhomogeneities Δ ; the time of spreading τ_c or the parameter of spreading δ of the

inhomogeneities. By analysis of the variations of the phase and of the rate of phase variation the direction of the reflected radiowaves could be determined. The correlation functions were calculated by means of an electronic computer

of the type "Strela". All the above-discussed results concern the layer F_2 ; they were found from May 1956 to October 1957.

Large-scale inhomogeneities have a distinctly anisotropic character; the dimensions depend on the direction. Numerical results are given for the dimensions of the inhomogeneities. The values of V_d are within the interval 0 - 40 km/min, and

most frequently the values 8 - 10 km/min are found. The values of V_d increase only slightly from night to day. Because of

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The Structure and the Motions of Large-Scale Inhomogeneities in the Ionosphere Layer F_2

the presence of inhomogeneities in the ionosphere, the normal to the front of the reflected wave deviates from the vertical direction. For δ and τ_0 the average values $\bar{\delta} \sim 0.3$ (day) and $\bar{\delta} \sim 0.58$ (night) and $\bar{\tau}_0$ were found. There are 1 figure, 1 table, and 6 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: July 18, 1958, by N. N. Bogolyubov, Academician

SUBMITTED: July 17, 1958

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